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ABSTRACT

The effect of mastery learning procedures on achievement and students' attributions for learning outcomes was studied with undergraduates enrolled in a general education course at a large state university. Most of the students were juniors and all had met selective admission requirements. It was hypothesized that mastery learning would result in more positive student learning outcomes and more internal attributions for both success and failure. The 34 students undergoing mastery learning procedures and the 88 control group students were pretested on the course content and were administered a revised version of the Adult Achievement Responsibility Scale, which measures attributions for the causes of academic performance. Throughout the semester, mastery learning students were administered tests and provided feedback and corrective activities. There were no significant differences between the mastery and control groups on entry-level content knowledge. Although mastery learning students achieved significantly higher final examination scores than did the control group students, no differences in attribution change were identified. The findings of Duby (1981) and the present findings are contrasted. (SW)

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THE INFLUENCE OF MASTERY LEARNING ON
STUDENTS' ATTRIBUTIONS AT THE COLLEGE LEVEL

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Abstract

This study was designed to determine whether the more favorable learning conditions provided by mastery learning procedures result in higher levels of achievement and more internal attributions on the part of college students. One hundred twenty-two undergraduate students enrolled in a general education course at a large state university participated in the study. Results showed that although students in mastery taught sections did attain significantly higher levels of achievement, no differences in attribution change were identified. Possible reasons for the lack of attribution change are discussed.

The Influence of Mastery Learning on
Students' Attributions at the College Level

In recent years, few areas of educational research have been as active as that concerning students' attributions. Attributions are the interpretations individuals make of the causes of behavior, either their own or other persons. Studies have shown that students' attributions bear strong influence upon their achievement-related behavior (Bar-Tal, 1978; Crandall, Katkovsky & Crandall, 1965; Weiner, 1974, 1979). The reasons students give in explaining their success or failure in academic situations appears to affect both their affective reactions and their expectations for future outcomes.

While numerous studies have investigated students' attributions in relation to various individual characteristics (Ames & Felker, 1979; Nicholls, 1975), and context variables (Ames & Ames, 1981), relatively few studies have considered the conditions under which attributions might be altered. Two notable exceptions, however, are the research of Bar-Tal, et al. (1982) and Duby (1981). Bar-Tal, et al. (1982) investigated the consistency of students' attributions over time and in different subject areas. They found that individuals' attribution patterns displayed great consistency, but were significantly more

consistent when outcomes were the same than when different outcomes were received. Duby (1981), on the other hand, investigated the change in students' attributions that result from improvements in learning outcomes brought about by more effective instruction. He found that under very favorable learning conditions, students attained more positive learning outcomes and also became more "internal" with respect to their academic attributions.

Similar to Duby's (1981) study, the purpose of this study was to determine whether more favorable learning conditions and more positive learning outcomes influence students' causal attributions. The more favorable learning conditions were provided through the implementation of mastery learning (Bloom, 1968, 1976). A key element in the mastery learning process is the use of feedback and corrective activities with each instructional unit. Under mastery learning, students are provided with regular checks on their learning progress (feedback) in the form of short quizzes or "formative" tests. These checks are then paired with specific corrective activities which are designed to help students remedy any learning difficulties they may be experiencing. With the provision of carefully planned feedback and appropriate corrective activities, mastery learning theory suggests that 80 percent of students may reach the same high level of achievement attained by only 20 percent of students under more traditional approaches to instruction.

Thus, this study inquired whether the introduction of a group-based, mastery learning model of instruction might alter college students' attributions for learning. It was hypothesized that the introduction of mastery learning would result in more positive student learning outcomes and more internal attributions on the part of students for both learning success and failure.

Method

The subjects in this study were 122 undergraduate students enrolled in seven class sections of a required, one semester, general education course at a large state university. The vast majority of these students were first-semester juniors. The content of the course covers topics in educational psychology and special education, with emphasis on teaching exceptional children in the mainstream of education. A set of common objectives has been designed for the course and an objective final examination, based upon those objectives, is administered to all students upon completion of the course. Each class section is taught by a different instructor, principally through a lecture and discussion format.

Two of the seven course instructors volunteered to implement mastery learning strategies in their sections. These two instructors worked together to develop a series of brief formative tests with accompanying feedback and

corrective activities. The tests were administered throughout the semester at the completion of instruction on each course unit. Following each test, students who did not attain the mastery standard of 90 percent correct were assigned corrective work to be completed outside of class. Corrective assignments were then collected at the next class session. Although instruction in all class sections was primarily group-based, and the course content, sequence of topics, and activities in each section were identical, these regular checks on learning progress and specific corrective activities were provided only in the two mastery learning sections.

At the beginning of the semester, students in all sections were presented a detailed set of course objectives and were informed that the final examination would be based on those objectives. Instructors then administered a 20-item, multiple-choice pretest on the course content to determine the entry level abilities of students. All students were also administered a revised version of the Adult Achievement Responsibility scale (Duby, 1981). Revisions to the scale included some minor rewording of the items to gain greater clarity, and the adoption of an alternative-weighting format for scoring, similar to that used in the Responsibility for Student Achievement scale (Guskey, 1981). It was believed this format would enhance the sensitivity of the scale in identifying changes in response patterns.

The Adult Achievement Responsibility scale is designed to measure adult students' attributions for the causes of their success or failure in academic situations. Primarily the scale assesses the internality of students' attributions, distinguishing attributions to ability and effort (internal), from those to task difficulty and luck (external).

At the end of the semester, the common course final examination was administered in all course sections. None of the items on the final examination was identical to items used in the formative tests of the two mastery learning teachers. All students were also re-administered the revised Adult Achievement Responsibility scale. The pretest scores, final examination scores, and scores from the pre- and post-treatment administrations of the Adult Achievement Responsibility scale comprised the principal data for the study.

Results

The analyses were based upon comparisons between scores attained by students in the two mastery learning sections (mastery) and the scores of students in the other five sections (control). Of the 122 students enrolled in the course, 34 were enrolled in the two mastery learning sections, and 88 were enrolled in the five control sections.

The data were first analyzed by computing means and standard deviations on the various measures for mastery and control sections. These are illustrated in Table 1. Tests of differences between the means indicated there was no statistically significant difference between the mastery and control groups in terms of entry level knowledge of the course content. Therefore, this measure was eliminated in further analyses. The difference in final examination scores, however, was statistically significant. On the average, students in the mastery sections attained higher scores on the final examination than did students in sections taught by more traditional methods. Neither pre- or post-treatment differences in responsibility for positive outcomes (R+) or responsibility for negative outcomes (R-) was statistically significant.

Insert Table 1

Correlations computed among the various student measures are shown in Table 2. Surprisingly, these correlations show that final examination scores were not significantly related to any of the attribution measures. Furthermore, the high positive correlations between pre- and post-treatment measures of responsibility indicate that generally these attributions remained fairly consistent from the beginning to the end of the course. Separate correlations computed

for the mastery and control groups revealed very similar patterns in each group.

Insert Table 2

To precisely test for differences between the mastery and control groups over time, it was necessary to first transform the original measures. This was required because of the within-subjects design with respect to the time factor (Finn, 1977). The transformations were conducted in the following manner. First, the pre- and post-treatment scores for both the R+ and R- scales were summed. These summed variables (Sum R+ and Sum R-) provide the tests for the main effect of the treatment. Then the pre-treatment scores were subtracted from the post-treatment scores to yield a pre-post difference. These difference variables (Difference R+ and Difference R-) provide the tests for the treatment-by-time interaction, the principal tests of interest for the study. The means and standard deviations of these transformed variables are listed in Table 3, and their intercorrelations are shown in Table 4. Again, the means, standard deviations, and correlations computed for the mastery and control groups separately were very similar.

Insert Tables 3 & 4

Because the final examination scores were uncorrelated with the attribution measures, differences in these scores were analyzed through a separate, one-way analysis of variance test. Results of this analysis are illustrated in Table 5. They show that students in the mastery sections did score higher on the final examination than students in the control sections of the course. Apparently the more favorable learning conditions provided by the mastery learning procedures did result in more positive learning outcomes, defined in terms of scores attained on the course final examination.

Insert Table 5

The results of the multivariate analysis of variance of the transformed attribution variables are shown in Table 6. As these results illustrate, the multivariate F-statistic and all univariate tests failed to meet the criterion of statistical significance. No differences were identified in the attributional assignments of students in the mastery sections versus students in the control sections. In addition, there were also no differences in the change in attributional assignments between the groups.

Insert Table 6

Discussion

The purpose of this study was to investigate whether the introduction of mastery learning instructional procedures would result in more positive student learning outcomes and more internal attributions on the part of college students. Results showed that the use of mastery learning did enhance the achievement of these college students, but failed to significantly alter their attributional assignments.

That the use of mastery learning did help these students attain higher levels of achievement is certainly not novel. Numerous studies have demonstrated similar positive results among college students (Block & Burns, 1976; Guskey & Monsaas, 1979). But the failure to identify any relationship between these more positive learning outcomes and students' attributions is contrary to the findings of Duby (1981), who identified a strong association between positive changes in achievement and increasingly internal attributions.

Several reasons might possibly explain the disparity between the results of this study and those attained by Duby (1981). First, the subjects involved in each investigation were quite different. Duby's sample was drawn from freshmen enrolled in open-admission, urban, community colleges. These students initially displayed rather low levels of internality in their attributional assignments. The subjects in the present study were primarily juniors in a

large, state university, all of whom had met selective admission requirements for entry into the education program. Pre-treatment measures of the attributional assignments of these students indicated rather high levels of internality. Because they were already more internal with respect to their attributions, these students were undoubtedly less prone to change than the students involved in Duby's research. In addition, because students in the present study were older and had more years of learning experience in a college environment than the freshmen in Duby's study, it is likely their attributions were more firmly established and less apt to change over the course of a single semester.

Second, in analyzing his results, Duby divided the students in the experimental classes into two subgroups: those who met "minimum conditions," and those who did not. The "minimum conditions" set by Duby included a high success rate on formative evaluation instruments, and a high rate of class attendance (p. 18). Fifty-seven percent of the students in the experimental classes met these conditions. The attributional changes noted in Duby's study occurred only among students who did meet these "minimum conditions." No attempt was made in the present study to subdivide the experimental group of students and, hence, possible changes among such a subgroup may have remained undetected.

Students' attributions are an extremely important variable in educational research. Although this study

failed to identify conditions under which such attributions can be altered, it is suggested that this may have been due to the characteristics of the particular subjects involved in the study. More investigations are necessary to further identify the nature of students' attributions, the conditions under which they are altered, and the interrelation between these conditions and pertinent student characteristics.

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Table 1

Means and Standard Deviations of Variables by Treatment Group

Variable	Mastery (n=34)		Control (n=83)	
	$\bar{x}$	(SD)	$\bar{x}$	(SD)
Pretest	11.04	(2.36)	10.89	(2.57)
Exam Score	26.56*	(2.50)	24.83	(3.77)
Pre R+	63.31	(8.12)	65.41	(6.18)
Pre R-	60.12	(8.37)	60.55	(7.91)
Post R+	65.53	(6.49)	66.51	(6.61)
Post R-	61.76	(9.02)	61.76	(6.98)

* $p < .05$ for the difference between the Mastery and Control groups

Table 2

Intercorrelations Among the Selected Variables

(n=122)

Variable	Exam Score	Pre R+	Pre R-	Post R+	Post R-
Exam Score	1.000	.098	-.063	-.020	-.017
Pre R+		1.000	.148	.598**	.205*
Pre R-			1.000	.055	.502**
Post R+				1.000	.402**
Post R-					1.000

*p<.05

**p<.01

Table 3

Means and Standard Deviations of Transformed Variables by Treatment Group

Variable	Mastery (n=34)		Control (n=88)	
	$\bar{x}$	(SD)	$\bar{x}$	(SD)
Sum R+	128.34	(13.98)	131.93	(11.05)
Difference R+	2.22	(4.55)	1.09	(6.46)
Sum R-	121.88	(15.30)	122.31	(12.83)
Difference R-	1.64	(8.29)	1.20	(7.62)

Table 4

Intercorrelations Among the Transformed Variables
(n=122)

Variable	Sum R+	Difference R+	Sum R-	Difference R-
Sum R+	1.000	-.045	.257**	.210*
Difference R+		1.000	.052	.311**
Sum R-			1.000	-.065
Difference R-				1.000

*p<.05

**p<.01

Table 5

Summary of ANOVA Results on Final Examination Scores

Source	df	Mean Square	F-Statistic	P
Constant	1	-	-	-
Treatment	1	73.34	6.12	.015
Residual	120	12.02		

Table 6

Summary of MANOVA Results on Transformed Variables

Source	df	Multivariate F-statistic	Univariate F's			
			Sum R+	Difference R+	Sum R-	Difference R-
Constant	1	-	-	-	-	-
Treatment	1	0.62	1.64	.86	.03	.08
Residual	120	Mean Squares	233.75	31.14	4.65	4.63